THE

HOME FRIEND;

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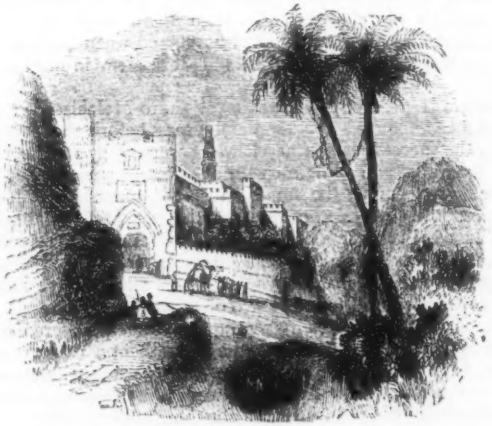
SCRIPTURE TOPOGRAPHY.—THE HOLY LAND.



WALLS AND GATE OF JERUSALEM.

BRIEF HISTORICAL NOTICE OF JERUSALEM.

THE inspired penman has truly said of Jerusalem, "Thy servants take pleasure in her stones, and favour the dust thereof." Though now degraded and defiled, ruined and desolate, we cannot forget that Zion was once the chosen mountain of Jehovah, the very perfection of beauty, and joy of the whole earth. From Jerusalem went forth the word of the law, —all nations went up to worship within her gates,—David, the man after God's own heart, reigned in her over the people of Israel, and his lyre sounded upon her sacred hills. The visible glory of the Lord shone in her beautiful temple; and, above all, upon this holy mountain the anointed Son of God shed his most precious blood—then burst the bands of the tomb, rose from the dead, and ascended up to heaven.

In Jerusalem, too, repentance and remission of sins were first preached to sinners in his glorious name,—and she was selected by both prophets and apostles as the type of "that great city, new Jerusalem," or as St. Paul styles her, "the Jerusalem that is above."

To the Christian reader every mention of the present afflicted state of this highly-favoured city will recall the prophetic words of our Saviour, "*Behold thy house is left unto thee desolate.*" But while in this point of view Jerusalem is to us all a fearful warning of the consequences of unbelief, and abuse of great privileges, in another respect she may remind us of that mercy which is greater than even our sins. The word of God leads us to hope and expect days of pardon and of peace for Zion, when Jerusalem shall "shake herself from the dust, and arise, and sit down." For when her children shall say, "Blessed is he that cometh in the name of the Lord," the curse shall be taken away, and "Jerusalem shall again be safely inhabited," "*in her own place, even in Jerusalem*," and "upon her inhabitants shall be poured out the spirit of grace and of supplication." Then shall "living waters go out of her," and the nations shall resort to her again, "year by year, to worship the King, and Lord of hosts." Then will her glory be *greater* than it was of old, for it will be more entirely the glory of *holiness*,—when "every spot in Jerusalem shall be *holiness unto the Lord of hosts*,"—when there shall be no more the Canaanite in the house of the Lord of hosts, and when her sons shall say, "There is strength for the inhabitants of Jerusalem in the Lord of hosts their God."*

"Jerusalem is presumed to owe its origin to Melchizedec; and if so, must have been founded two thousand years before the advent of our Lord. In the succeeding century it was captured by the Jebusites, who extended its walls, and built a castle or citadel upon Mount Sion. It was taken from them by the forces under the command of Joshua,† but they long retained possession of the fortress; nor was it established as the capital of Israel till the time of King David. Its magnificence was chiefly owing to the works of his son and successor, Solomon, who adorned it with sumptuous edifices, and, above all, with a temple . . . which has in no age been, nor will be, excelled in splendour and magnitude. During the period of Rehoboam the city was stormed and plundered by Shishak king of Egypt; and a similar fate befel it about a century and a half afterwards, from Joash king of Israel. In the reign of Manasseh it was besieged and taken by the Assyrians, when the idolatrous monarch was carried captive to Babylon. Its destruction, however, was not effected till the time of Zedekiah, when Nebuchadnezzar, actuated by a spirit of fury, committed terrible ravages, razing the fortifications, setting flames to the temple, and carrying away the inhabitants as prisoners, in the view of adding to the population of his own capital. Seventy years afterwards they were restored, and Zerobabel began to rebuild the sacred structure. Alexander the Great could not be said to have taken it, since the place voluntarily submitted to him, when he entered it as a friend, and offered sacrifices in the temple. It was sacked by Antiochus Epiphanes, who profaned the holy city by placing the image of Jupiter in it.

"The Maccabees, who restored the independence of their country, rescued it from the heathen, but a contest between their descendants gave the Romans an opportunity for interfering, and Pompey made himself

* Zech. i. 17, viii. 8, xii. 5 (marg. reading), 6, xiv. 11, 21.

† Joshua xv. 63, xviii. 28; Judges i. 8.

master of the capital, which he surnamed Hierosolymarius. Judæa, revolting from the Roman yoke, was besieged by Titus, captured, and totally destroyed in the year of our Lord 70, when 97,000 persons were taken prisoners, and 110,000 perished.* Reflecting on its former beauty, riches, and glory, Titus could not forbear weeping, and cursing the obstinacy of the seditious Jews, who forced him, against his inclination, to destroy so magnificent a city, and such a glorious temple as was not to be paralleled in the whole world. It was again rebuilt by the Jewish nation; but fresh commotions breaking out, Adrian expelled every Hebrew, and made it death for any of them to enter it. He then began a new city on the ruins of the old, which is supposed to be the present one. But it was Constantine and his mother Helena who had the honour of restoring here the worship of the one living and true God. The caliph Omar, the third in succession from Mahomet, was its next conqueror. In the year 1099, it was again taken by Godfrey of Bouillon in the great crusade, when the standard of the cross was triumphantly displayed upon its walls, and it again became the capital of a kingdom; though Godfrey, when offered the diadem, refused it, declaring that he would never receive a crown of gold in that city where the Saviour of the world had worn a crown of thorns! . . . In 1217 this monarchy was abolished, and since this period the 'city of the Lord' has remained the capital of a Mahometan province.

". . . The capital of Judæa has passed under various denominations. . . . In the first place, it is supposed to be compounded of two appellations, Salem, or Peace, and Jebus,† afterwards changed to Jerusalem. Some suppose it signifies 'Fear Salem,' because the city was very strong; others, 'They shall see Peace;' and many, with a greater degree of probability, say it means 'The Inheritance of Peace.' In the sacred page we find it called the city of David, the city of God, the holy mountain, the holy hill, the throne of the Lord, and the house of the Lord God of Israel, the city of the great King, the throne of Judgment, the throne of the house of David, a place for the Judgment of the Lord, and for matters of controversies, the city of Truth, the city of Joy and a Defence, his Tabernacle;‡ by the Hebrews, Jeruschalem; the Greeks and Romans, Hierosolyma; and the Mahometans name it Kuddish, or the Holy, and also the Lady of Kingdoms."—RAE WILSON'S *Travels*, i. 198—202.

ASPECT OF THE COUNTRY ABOUT JERUSALEM.

WHEN drawing near Jerusalem from the valley of Elah, Mr. Paxton observes:—"We passed a district where an immense quantity of stone had been quarried and removed; the refuse stone lay in piles, and the excavations showed that large quantities had been procured. The face of the high ridge, or kind of table-land, over which we now passed, was almost wholly destitute of vegetation. A few thistles and an occasional small thorn-bush might be seen; but a more naked district I had not seen in the Holy Land. Several miles to the right I saw a hill or hills pretty well covered with trees of some sort—olives, I thought from their looks; and at a greater distance on our left I saw several patches of trees on the

* Isaiah ii. 17; Jer. xxv. 15. † 1 Chron. xi. 4.
‡ See Dan. ix. 16; Ps. xcix. 8, xlviii. 2; Matt. iv. 5; Neh. xi. 1; Ezra i. 3; 2 Chron. xix. 8; Deut. xvii. 8; Zech. viii. 3; Isa. xxii. 2.

side of a high and long ridge, and a small village or two near them; but more immediately about me, and over the whole face of the ridge which I was passing, all was naked, all was destitute of vegetation, except a small enclosed spot. I was struck, not only with the absence of vegetation, but with the enormous quantity of rough rock that almost literally covered the face of the ground. Much of it lay in irregular patches, projecting from eighteen inches to five or six feet above the little earth that could be seen. It really appeared as if the district was *given up* to be *occupied by rocks*, to the exclusion of all other matter."—PAXTON, p. 112.

MOUNT MORIAH.

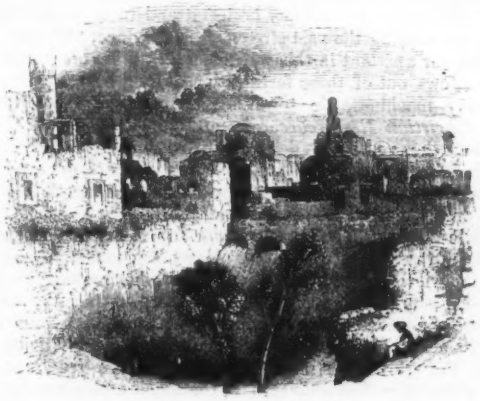
"On reaching the rocky heights of Beer," (writes Mr. Jowett, travelling towards Jerusalem,) "the country began to assume a more wild appearance. Uncultivated hilly tracts, in every direction, seemed to announce that not only Jerusalem, but its vicinity for some miles round, was destined to sadden the heart of every visitor. Even the 'stranger that shall come from a far land,' it was predicted,* should be amazed at the plagues laid upon this country; and this became more than ever literally fulfilled in my feelings as I drew near to the metropolis of this chosen nation. Expectation was indeed wrought up to a high pitch as we ascended hill after hill, and beheld others yet more distant rising after each other. Being apprehensive lest I should not reach the city gate before sunset, . . I repeatedly desired the guides to ask the Arabs whom we met, how far, or, according to the language of this country, how many hours, it was to Jerusalem? The answer we received from all was, 'We have been at the prayers at the mosque of Omar, and we left at noon;' to-day being the Mohammedan sabbath. We were thus left to calculate our distance. The reply sounded very foreign to the ears of one who knew that formerly there were scenes of purer worship on this spot. 'Thither the tribes go up, the tribes of the Lord, to the testimony of Israel, to give thanks unto the name of the Lord.' At length, while the sun was yet two hours high, my long and intensely interesting suspense was relieved. The view of the city burst upon me as in a moment; and the truly graphic language

* Deut. xxix 22.

of the Psalmist was verified in a degree of which I could have formed no previous conception. Continually the expressions were bursting from my lips—'Beautiful for situation; the joy of the whole earth is Mount Zion! —They that trust in the Lord shall be as Mount Zion, which cannot be removed, but abideth for ever!—As the mountains are round about Jerusalem, so the Lord is round about his people, from henceforth, even for ever!'

"Among the vast assemblage of domes which adorn the roofs of the convents, churches, and houses, and give to this forlorn city an air even of magnificence, none seemed more splendid than that which has usurped the place of Solomon's Temple. . . . A more soothing part of the scenery was the lovely slope of the Mount of Olives. . . . As we drew nearer and nearer to the 'City of the great King,' more and more manifest were the proofs of the displeasure of that great King resting upon His city. Like many other cities of the East, the distant view of Jerusalem is inexpressibly beautiful, but the distant view is all. On entering at the Damascus gate, meanness, filth, and misery, not exceeded, if equalled, by anything which I had before seen, soon told the tale of degradation. 'How is the fine gold become dim!' I went onward pitying everything and everybody that I saw."—JOWETT's *Researches*, pp. 206—208.

"Viewed from a distance, Jerusalem presents a most imposing aspect, and you are struck with its apparent grandeur and extent; but on entering it, all your expectations of magnificence are disappointed. It might be laid in ruins by a few pieces of artillery. . . . Within the walls, ruins, wretchedness, desolation, narrow streets, miserable (shops), with a few relics of sculpture, seem to constitute all the evidence of its former grandeur; and its inhabitants are most filthy in dress and general appearance."



VIEW IN JERUSALEM.

"One circumstance struck me forcibly, viz., the husbandman being busily occupied in the operations of the plough along the hill of Zion; most remarkably exhibiting, at the present day, the fulfilment of the prophecy uttered first by Micah, and afterwards quoted by Jeremiah, '*Zion shall be ploughed as a field.*'"—JOWETT, p. 262.

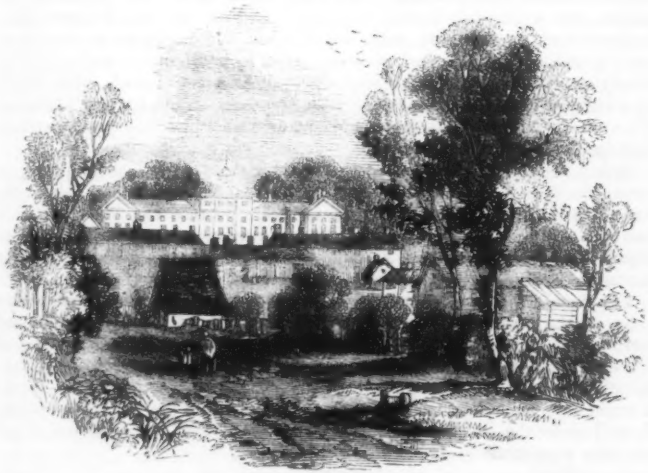
Having alighted at a small village on the Mount of Olives, Mr. Jowett thus describes the view of Jerusalem from it:—"Sheltering ourselves beside one of the olive-trees from the west wind, which blew sharply, we enjoyed a fuller prospect of the city, every part of which lies plain before the view from this eminence. The whole of Jerusalem seems like one continuous hill, standing out singly from the midst of the surrounding mountains. To the north, east, and south, it is surrounded by the deep valley, which, in its various parts, has, at different times, borne the names of the Brook of Cedron, the Valley of Jehoshaphat, Tophet, and Gehinnom. On the west, the ground adjacent to the walls is, comparatively speaking, level ground; but these walls, on the western part, take in a considerable number of habitations which did not belong to the city, and did not, in fact, exist in the most ancient times. They include Bezetha and Mount Calvary. Bezetha was added in the time of Herod and Pilate; and Mount Calvary, which now groans beneath the weight of monastic piles, was probably open ground, cultivated for gardens,* at the time when He who *suffered without the gate*,† there poured out his soul unto death. It is not difficult to conceive, observing from this spot the various undulations and slopes of the ground, that when Mount Zion, Acra, and Mount Moriah constituted the bulk of the city, with a deep and steep valley surrounding the greater part of it, it must have been considered by the people of that age as nearly impregnable. It stands '*beautiful for situation!*' words which have perpetually burst from my lips as I have surveyed all the surrounding scenery, and this unique, crowning centre of the whole. It is indeed '*builded as a city that is compact together.*‡ '*The kings of the earth, and all the inhabitants of the world, would not have believed that the adversary and the enemy should have entered into the gates of Jerusalem.*'§ This was said nearly two thousand four hundred years ago; and when, 650 years after, Titus besieged and took this devoted city, he exclaimed, on viewing the vast strength of the place, 'We have certainly had God for our assistant in this war; and it was no other than God who ejected the Jews out of these fortifications; for what could the hands of men, or any machines, do towards overthrowing these towers?'"—JOWETT'S *Christian Researches, &c.*, pp. 254—256.

Mr. Jowett thus relates his departure from Jerusalem:—"At half-past eleven o'clock we passed the Damascus gate of the city; and in half an hour reached the top of the hill, from which I had caught the first view of Jerusalem on my arrival, and from which I was now to see it for the last time. While the servants went on, I rode to a fair green spot, and turned my horse's head round, that I might enjoy a few moments' solitary meditation on the view before me. . . . I must bid farewell to Jerusalem. The noon-day sun shines strong and bright upon the city, and seems to mock its base condition. What a contrast between its aspect at this distance, and its actual state! Here, the smaller objects not being minutely discernible, the glowing strains of David seem as true and lively as they were when they first answered to the touch of his instrument of ten strings. 'Beautiful for situation, the joy of the whole earth, is Mount Zion.' Still there seem to be her towers, her bulwarks, and her palaces, challenging our admiration. But I have now, for more than twenty days, known that these are not the towers nor the temple of ancient times. At every step, coming forth out of the city, the heart is reminded of that pro-

* John xix. 41. † Heb. xiii. 12.
‡ Ps. cxxii. 3. § Lam. iv. 12, B.C. 588.

phecy, accomplished to the letter, '*Jerusalem shall be trodden down of the Gentiles.*'* All the streets are wretchedness; and the houses of the Jews more especially (the people who once held a sceptre on this mountain of holiness) are as dunghills. While I gazed, my eyes filled with tears, till I could look no longer. . . . 'Lord, how long!'"—JOWETT'S *Christian Researches*, pp. 269—271.

PERSEVERANCE UNDER DIFFICULTIES.



BOULTON AND WATT'S FACTORY.

JAMES WATT.

THE same age which produced William Herschel produced also James Watt. While the former was directing his observations to the motions of the heavenly bodies, and making new discoveries in our celestial globe, the latter was devoting his attention to the study of sublunar things, and pursuing inventions which were to change materially the social state of our own planet.

James Watt, by whom the steam-engine was first brought to a state of practical efficiency, was born just two years before Sir William Herschel, and died three years before him, A.D. 1819, having reached the age of eighty-four: a proof, in both cases, that a life of study and labour, if a virtuous and temperate one, need not wear out the bodily frame.

The health of Watt, in his childhood, was so exceedingly delicate, that he could not be sent to school; and during his life he suffered from a

* "The author would here add, that he has, subsequently, very often meditated on that phrase; and he can with truth affirm, that no expression could have been invented more descriptive of the visible state of Jerusalem than this single phrase, *trodden down*, furnished by the most lively and descriptive of all writings extant, the Bible."

weakly constitution, although energy and perseverance forbade him to yield to its influence. At six years of age he was seen lying on the hearth apparently playing with a bit of chalk he had in his hand. A friend who came to visit his father was annoyed at seeing the boy so idle, and told his father that he ought to send him to school, and not suffer him to trifle away his early years in such a manner. The father whispered a request that he would observe what his son was doing with the chalk; and the gentleman, bending over the hearth, found the boy had drawn mathematical figures there, and was trying to solve a problem. He had been taught to read, but he seldom learnt lessons. He made good use of the knowledge he gained, and even while a child acquired a vast deal of that general information which in after life made his company and conversation so entertaining and useful. He early showed a taste for mechanics; and his father wisely consulted it in making him a present of a set of tools, with which he contrived to make a number of toys, and even an electrifying machine. Thus in his boyhood was the genius manifested which his riper years so largely displayed.

It has been within the present half-century that the wonderful power of steam has been very extensively employed to supersede human labour in most departments of trade and manufacture. Within the same period it has been still more astonishingly applied to locomotive purposes, the use of which has already produced a prodigious effect on society by facilitating the intercourse of nations, as well as individuals.

But though the practical use of this great power is so modern, the knowledge of the power itself is not so. It was included in the wisdom and learning of the Egyptians, in which Moses was said to be skilled, and of the extent of which recent discoveries have enabled us to form an idea. Scientific authors have supposed that even the paddle-wheel, so lately brought into use among modern nations, was known to that singular people, as well as to the Romans; and some assert that from very ancient times attempts were made to propel vessels by steam.

A specimen, or model, of a toy steam-engine was described by a Greek of Alexandria more than a century before the Christian era; and this possibly afforded hints to many later inventors. The subject, dropped, or unheard of from time to time, appears to have been again and again taken up by scientific minds, which, unfortunately for their possessors, were in advance of their age, and were not understood, if not actually persecuted, by their more ignorant contemporaries. About the era of the Reformation a Spaniard exhibited a model steam-vessel to the Emperor Charles V.; but the age for steam experiment had not yet arrived.

It is to their countryman, Salomon De Caus, that the French ascribe the honour of inventing the steam-engine, while they yield to our James Watt the merit of bringing it nearly to perfection, and rendering steam-power, as a moving force, applicable, so extensively, to practical purposes.

The history of De Caus is a melancholy one. He, too, lived before the age to which his genius was suited. It is only since the power of steam, as a moving force, has excited the attention of scientific Europe, and its utility been tested, that the discoveries of De Caus, about two hundred and fifty years ago, have become generally noticed.

In the reign of King James II. Salomon De Caus was brought over from Normandy to Richmond near London, and employed in forming water-works, fountains, grottoes, &c., in the garden of a palace for the Prince, afterwards Charles I. The Elector of Bavaria afterwards engaged

his services; and in Germany he published a work descriptive of his invention of a method of raising water by partially heating it, so that a portion of the fluid should be converted into steam, and by its expansive force drive the remainder through a tube prepared to conduct it to a reservoir.

The steam machine, however, which he described, is considered as little more than a toy, which might suggest ideas to other inventors. Unhappily for himself, this man of genius, of whom France is now justly proud, returned thither to give his country the benefit of his supposed inventions. He had then distinguished himself as an engineer, a painter, and an architect; but whether his inventions and scientific studies had really turned his brain, or that persons incapable of comprehending them believed him to be mad, for no other reason than that they could not understand him, cannot be certainly known. His claims as an inventor, or a discoverer of steam-power, met with no attention; but his zeal in soliciting the patronage of the great and formidable Cardinal Richelieu, the powerful minister of Louis XIII., was the means of consigning him to the most dreadful doom that could have been inflicted on a living creature.

The Bicêtre was a place of confinement in France for real or supposed lunatics; and one, the cruelties of which were so great, that the darkest threat which could be uttered was that of sending a person to the Bicêtre.

A letter written in the year 1641, by a celebrated lady of Paris, gives a fearful account of the unhappy De Caus, and affords us a very gloomy prospect of the nature of the times to which it relates. Before quoting it we may observe, that the Marquis of Worcester was himself a lover of the pursuits to which the unfortunate Frenchman fell a victim. The following is an extract from the letter referred to:—

"I have been doing the honours of Paris to your English lord, the Marquis of Worcester. He leads me from curiosity to curiosity; selecting always the most sad and serious, speaking little, listening attentively, and fixing on those he questions two great blue eyes, which seem to penetrate to the bottom of their thoughts. Besides, he is never content with the explanations that are given to him; he does not take things on the side they are shown to him. For instance, in a visit we have just made to the Bicêtre, in a madman he thinks he has discovered a man of genius. If the madman had not been furious, I believe your Marquis would have demanded his liberation, taken him to London, and listened to his ravings from morning to night.

"As we were traversing the madmen's court, and whilst I, more dead than alive, so frightened was I, clung to my companion, a hideous face showed itself behind the bars, and began to cry in a hollow voice—'I am not mad!—I have made a discovery which would enrich my country.'

"'And what is his discovery?' said the marquis to the keeper who showed us the house.

"'Ah!' said the man, shrugging his shoulders, 'something simple enough! You could never guess it,—it is the use of the steam of boiling water!'

"I began to laugh. 'This man's name is Salamon De Caus,' said the keeper. 'He came from Normandy four years ago to present to the king a treatise on the marvellous effects which might be obtained from his invention. According to him, with steam you might turn mills, make carriages go, and perform a thousand miracles. The cardinal dismissed the fool without listening to him. Without being discouraged he set about following the cardinal everywhere, who, weary of finding him for ever at

his heels, and of being importuned by his follies, ordered him to be confined in the Bicêtre, where he has been shut up for three years and a half; he calls to every visitor that he is not mad, and that he has made a wonderful discovery. He even composed a book on the subject, which I have.'

"My Lord of Worcester, who had become quite thoughtful, asked for the book. After reading some pages, he said, 'This man is not mad; and in my country, instead of shutting him up, we should have loaded him with riches. Lead me to him: I wish to question him.'

"He was conducted to the cell; but returned sad and thoughtful.

"'Now indeed,' said he, 'he is mad: misfortune and suffering have driven away his reason for ever. But when you cast Salomon De Caus into this dungeon, you cast there the greatest genius of your age. Thereupon we departed, and from that time he talks of nothing but Salomon De Caus."

At that age a love of science often proved a dangerous gift. Its votaries, by superior knowledge, or curious experiments, ran no small risk of incurring suspicion of sorcery or magic, which subjected them to severe persecution, if not to a cruel death.

The Marquis of Worcester succeeded De Caus in the path of invention and steam discovery. He published his account of these in the year 1663. Lord Brougham remarks that "he undoubtedly made one step in advance of De Caus towards the use of steam-power."

Lord Worcester described one of his inventions as "an admirable and most forcible way to drive up water by fire;" spoke of his "stupendous water-commanding engine," and declared his intention of having his model buried with him. It is presumed that his engine was constructed on a large scale, as the funnel was represented by a cannon.

No practical benefit, however, was derived from the inventions he described, or the scientific experiments he made. The time to favour such operations had not then arrived.

About thirty years afterwards a Frenchman, named Papin, settled in London, and made a digester, which is still called by his name. His experiments and researches into the power and use of steam produced several important additions to the knowledge thus slowly accumulating. The invention of the safety-valve, applied to steam-engines, is ascribed to Papin, although it is supposed that he never made any steam-engine himself.

The French, in general, claim the honour of being inventors, and yield to the English the merit of being improvers, or imitators. Eight years after the publication of Papin's work on steam-power, Captain Savary made some improvements on the apparatus he described; and in the year 1711, two men of humble station, Newcomen, an ironmonger, and Cawley, a glazier, of Dartmouth, constructed a steam-engine on the principles described by Papin, and with some improvements suggested by Savary. This engine could be used in raising water from mines; and thus the first practical use of steam-power was achieved by them, although it is said that atmospheric pressure, and not steam, was its moving force. Brighton and Smeaton made further improvements in the steam-engine. Thus were the scientific efforts and genius of different ages and countries combining together, until the grand improver of the steam-engine appeared, and nearly completed the object for which they had all united.

Lord Brougham says, that "previous to the time of Watt, not only had no means ever been found of using steam-power for any purpose but that of drawing up water, but even in that operation it was defective, and very expensive. . . The great consumption of fuel it required was its chief

defect; the other imperfection was its loss of all direct benefit from the expansive force of the steam itself. That element could only be used in creating a vacuum; and an air-pump might have done as much, had it been worked by water or by horses. It was, in the strict sense of the word, an air and not a steam engine." At such a period of steam-history James Watt was a mathematical instrument-maker in the town of Glasgow. At that time there were a number of eminent men Professors at the University. The Glasgow Body of Arts and Trades had refused Watt permission to follow his calling in their city, as he was not a freeman of their guild. He was denied the use of a small workshop; but the members of the University gave him one within its walls, and appointed him their instrument-maker. Some of these works are still preserved as memorials of the workman whose name became so distinguished. One of the eminent men who were then students at that University, Professor Robison, who became his great friend, thus speaks of James Watt when he was a young man in his workshop:—"When I first was introduced to Mr. Watt, I saw a workman, and expected no more; but was surprised to find a philosopher, as young as myself, and always ready to instruct me. . . . Whenever any puzzle came in the way of us students, we always went to Mr. Watt." All this time Watt was devoted throughout the day to his business; it was only late in the evening, or at night, that he prosecuted his studies; and while he suspended his trade to give assistance or information to the young students who sought for either, he did not suffer his love of reading, or philosophical research, to interfere with the daily labours on which his living depended. There chanced to be among the apparatus by which the Professor of Natural Philosophy illustrated his lectures in the University, a model of the steam-engine made by Newcomen and Cawley, and known as Newcomen's engine. This little engine, from some defect in the workmanship, did not act properly, and it was sent to Mr. Watt to be set to rights. To this apparently trivial accident the civilized world is perhaps indebted for the discoveries and improvements made by James Watt with respect to the use of steam. The defects in the construction of the engine engaged his attention, and these observations led him to make a variety of experiments upon steam. In the University he had witnessed the experiments on heat made by Professor Black, and had learned from him the true cause of evaporation and condensation. When, therefore, he began to experiment upon the mechanical application of steam, he possessed the advantage of thoroughly knowing the principles on which its changes and action depended. His own experiments now put him in possession of the causes which determine the rapidity of evaporation, the proportion which it bears to the surface exposed to the fire, the effects of pressure on the boiling point, the quantity of fuel required to convert a given quantity of water into steam—circumstances which had hitherto been vaguely understood, and generally examined, but which he now reduced to mathematical precision.

Continuing his experiments and labours with patient perseverance, he soon arrived at the conviction that one-fourth (or one quarter) of the fuel consumed by Newcomen's engine would be sufficient to work one with his improvements; and finally, before two years had quite expired from the time when the model engine was sent to him to be repaired, Watt had formed one on a nearly new plan, which he was satisfied was "of incalculable power, universal application, and inestimable value." "His investigations," says an eminent scientific Frenchman, "might have occupied the lifetime of a laborious philosopher, while Watt brought his numerous and

difficult researches to an end without ever suffering them to interfere with the daily labours of his workshop."

"One would expect," adds the same writer, Monsieur Arago, "that such an engine would at once supersede, as a draining machine, the very expensive one of Newcomen; but this was not the case." The reason was, that Watt had not money to bring out his invention himself in such a way as would recommend it to the public, or to secure his right in it by taking out a patent before he made it generally known. For a considerable time it consequently lay useless, while the inventor was employed as an engineer in the grand works then carrying on in Scotland.

After many disappointments, much patient waiting, and at the same time diligent labour in occupations which were not shut out from him by the obstacles that prevented the employment of his steam-engine, Mr. Watt finally formed, in the year 1774, a partnership with a rich proprietor of an iron foundry, Mr. Boulton of Soho Foundry, near Birmingham. From that time his career was open; he could command money, which was necessary to make his invention known; and these inventions, when known, made money in return. Newcomen's imperfect and expensive engine was quickly put out of use, and that of Watt was employed in all mining districts. The agreement made with those who employed these new engines was, that they should pay to the inventor a third part of the value of the fuel saved by their use in the place of those of Newcomen's. The value of the inventions of Watt, in point of saving alone, can be judged of by the astonishing fact, that the proprietors of one mine in Cornwall paid him 2,400*l.* for each engine, in one year, as a compensation for a third of the coal saved by their employment.

The facility thus afforded to mining operations, and the greater economy with which they could be carried on, naturally gave a considerable impulse to such works. The use of the steam-engine was at first confined to mines, and chiefly for the purpose of raising the water. Watt, however, did not rest satisfied with its achievements in this way; a mind like his could not be content to stop short while so much was yet to be done. His steam-engine was at work, and remunerated his labours well; but there were many improvements to be made in it. He continued his investigations, his labours and inventions, until he had discovered the secrets necessary for increasing the power of steam-engines to the highest degree. "But power," Monsieur Arago wisely observes, "is not the only element of success in works of industry. Regularity of action is of no less importance." Watt produced this mechanical regularity of action in the steam-engine by the invention of the apparatus appropriately termed "the governor," which regulates the quantity of steam admitted from the boiler to the cylinder. By the means of this, and other curious inventions, that astonishing engine could now work any sort of machinery, even the most delicate; it could spin cotton, as well as cut bars of iron and brass; it could grind corn, and print books; it could be brought to form the wheels of a watch, give movement to a time-keeping clock, spin a thread almost too fine for sight, or make the earth appear to tremble to its sound, as it performed its giant works.

"It is this regulator of Watt's," says the distinguished author before quoted, "and a skilful employment of fly-wheels, which constitute the true secret of the astonishing perfection of the manufactures of our epoch. It is this which confers on the steam-engine a working movement which is totally free from irregularity, and by which it can weave the most delicate fabrics,

as well as communicate a rapid movement to the ponderous stones of a flour-mill."

In 1809 the fertility of his inventive powers was shown by a beautiful solution of a difficult problem laid before him by a water company at Glasgow, who, after establishing their works upon one side of the river Clyde, discovered that water of a very superior quality might be procured from a kind of natural filter on the other side, if they could overcome the difficulty of laying a main from their pumps across the bed of the river. Watt contrived for this purpose a flexible iron pipe, the pieces of which were connected by a kind of ball-and-socket joint, of which he took the idea from the tail of a lobster. The main was constructed from his designs in the following year with the most complete success; and it forms a tube of about a thousand feet long and two feet in diameter, capable of bending and applying itself to the bed of the river.

Mr. Watt made many other discoveries which justly entitle him to the character of a natural philosopher and a man of science. We may conclude this slight sketch with the following extract from a description of the man of whom Scotland may be justly proud, given by his countryman and friend, the late Lord Jeffrey:—

"Independently of his great attainments in mechanics, Mr Watt was an extraordinary, and in many respects a wonderful man. Perhaps no individual of his age possessed so much, and such varied and exact information: had read so much, or remembered what he had read so well. He had infinite quickness of apprehension, a prodigious memory, and a certain rectifying and methodising power of understanding, which extracted something precious out of all that was presented to it. That he should have been minutely and extensively skilled in chemistry and the arts, and in most branches of physical science, might have been conjectured; but it could not have been inferred, from his usual occupations, that he was curiously learned in many branches of antiquity, metaphysics, medicine, and etymology, and perfectly at home in all the details of architecture, music, and law. He was well acquainted, too, with most of the modern languages, and familiar with their recent literature. His astonishing memory was aided no doubt by a higher and rarer faculty;—by his power of digesting and arranging in his mind all the valuable information he received, and of casting aside and rejecting, as it were instinctively, whatever was worthless or immaterial."

The mention of music among these acquirements leads us to quote another passage from a different writer. The noble biographer of Mr. Watt thus speaks on that subject:—"He had no ear for music: not only was he insensible to its charms, but he could never distinguish one note from another; yet he undertook (in his younger days) the construction of an organ; and the instrument he made not only had every mechanical merit, but produced the most admirable harmonic results, so as to delight the best performers."

He overcame the difficulty which nature appeared to have thrown in his way in this respect by surpassing industry and perseverance, and by practising a theory then little understood, and only contained in a work at once profound and obscure, "Smith's Harmonics." Watt, while yet little known to fame, made a guitar for a young lady, for which he received in payment five guineas.

One peculiarity of his manner is mentioned. "There was a little air of affected testiness, and a tone of pretended rebuke and contradiction, with which he used to address his younger friends, that was always felt by them

as an endearing mark of kindness and familiarity, and prized above all the solemn compliments that ever proceeded from the lips of authority. His voice was deep and powerful, though he commonly spoke in a low and somewhat monotonous tone, which harmonized admirably with the weight and brevity of his observations, and set off to the greatest advantage the pleasant anecdotes which he delivered with the same grave brow and calm smile playing soberly on his lips."

Lord Jeffrey further says that Mr. Watt "had in his character the utmost abhorrence for all sorts of forwardness, parade, and pretension; and, indeed, never failed to put such impostors out of countenance, by the manly plainness and honest intrepidity of his language and deportment." His great countryman, Sir Walter Scott, thus speaks of him:—

"Amidst this company stood Mr. Watt, the man whose genius discovered the means of multiplying our national resources to a degree perhaps beyond his own stupendous powers of calculation and combination; bringing the treasures of the abyss to the summit of the earth,—commanding manufactures to arise,—affording means of dispensing with that time and tide which wait for no man,—of sailing without that wind which defied the commands and threats of Xerxes himself. This potent commander of the elements—this abridger of time and space—this magician, whose cloudy machinery has produced a change in the world, the effects of which, extraordinary as they are, are perhaps only now beginning to be felt—was not only the most profound man of science, the most successful combiner of powers and calculator of numbers, but one of the best and kindest of human beings. . . . In his eighty-first year, the alert, kind, benevolent old man had his attention ready for every one's question, his information at every one's command."

Mr. Watt died peacefully at his residence in Staffordshire, on the 25th of August, 1819, in his eighty-fourth year.

The prime minister of the time, Lord Liverpool, presided at his funeral; and the late lamented Sir Robert Peel expressed the obligation under which he lay to the genius of him whom they were then commemorating,—the fortunes of his family being raised by manufacturing industry, founded on the happy inventions of Arkwright and Watt.

A fine statue of Watt, executed by Chantry, stands in Westminster Abbey, with an inscription written by Lord Brougham. Several statues have been erected to him in various places: among others, there is one in the cemetery of Père la Chaise, at Paris.

Among other useful inventions of which Watt was the author, we must not forget the machine for copying letters, &c., so usefully employed by clerks in offices, and another for taking copies of sculptures, busts, &c. He also devised the method of heating buildings and hot-houses by steam; and he was the first who discovered the real nature of water, or the elements of its composition.

His grand inventions, however, relate to steam and the steam-engine; and in so briefly noticing his life and labours, we glanced no less briefly over the history of that wonderful power previous to his time.

It is a curious fact, that steam is no less than one thousand seven hundred and twenty-eight times greater in bulk than the water from which it was formed. The object of the steam-engine is to catch the water expanding into steam, and to make use of that expansive force, which is about eight times greater than the expanding force of gunpowder.

Whatever knowledge may have existed on this subject, even from very early times, it was Watt alone who fully reduced the theory to practice.

NO WEATHER SENT IN VAIN.

"If we have no rain in less than eight-and-forty hours," exclaimed Mr. Dobson, the proprietor of a small farm in one of the eastern counties, "there will not be a turnip to be seen. Twice did I sow this field with the best seed I could get, and if I had sown it a third time it would have been to no better purpose, unless we have a change of weather directly."

He said the same words the next morning, and that, too, in a tone of increased vexation. He viewed the clouds, consulted his "glass," which was never known to err: it stood at Fair, the point it had maintained for several days; and when he gently tapped it with his knuckles, the index refused to move, or, if there was any variation, it inclined towards a higher point. He watched anxiously whether the swallows flew near the ground, or otherwise; inquired whether the dew rose heavily the previous evening; what appearance the moon presented at the change, whether she lay on her back or not—the certain indication of rain in his opinion—but in vain; disappointment followed equally his own observations and the replies of others. He did not, indeed, openly give vent to his dissatisfaction, or express the almost reproachful thoughts that lurked in his heart; but any one at all acquainted with him would have been at no loss to account for the unusual ill-humour he displayed, and to attribute his irritation to the idea of the total failure of his crop of turnips.

In this unenviable state of mind, as he was riding home in the evening, he overtook a person who hired a farm adjoining his own, an honest and industrious man, with a large young family entirely dependent upon him, and who was not, like himself, in easy circumstances. He had never been "well-to-do," and had often been unfortunate where others had been successful. The usual expression of his countenance was careworn and dejected. This evening it was the very reverse. His manner, too, was entirely different. He was animated and cheerful; and, instead of the mere "good night," or "good morning," interchanged between them, Marsh—for that was his name—seemed even inclined to enter into conversation.

"Bad weather this for us farmers," observed Mr. Dobson, again casting his eyes anxiously round the horizon. "There is no more appearance of rain this evening than there was ten days ago. I shan't have a dozen

turnips in my ten acres. I was in hopes we should have had a soaking rain both yesterday and to-day, but it has all passed off."

"Heaven be praised that we had not!" fervently ejaculated Marsh. "I should have been ruined if we had had the soaking rain you speak of."

"How so?" inquired Dobson. "O, by the by, I saw you busy with your mustard seed, so I did."

"Yes," returned Marsh. "It was a great venture. All things lately have gone very hard with me. I lost both lambs and ewes in the spring, and my rent"—he sighed and shook his head, then cheerfully continued—"I had been strongly advised to sow that field near yours with mustard. I yielded, because I valued the opinion of him that gave it; but I did so with a trembling heart, for you know what a precarious crop it is. The seed came up beautifully. There never was a better promise. It was getting ripe, but I really had not the courage to cut it. 'Come, come,' said Clarke, 'we must not dally any longer in this way. Never be afraid. You shall see me and my whole party the day after to-morrow, men, women, and children, tarpauling and all.' If I had chosen the weather to suit me, it could not have been more favourable. Not a drop of rain, as you know, has fallen upon it; it has been cut, threshed, and safely lodged, all in a few hours, in the finest condition. The price is high, the quality is excellent, and I shall now overcome all my difficulties. O, Mr. Dobson, if rain had come and spoilt my crop, my children would have been without a home, and my wife and I beggars!"

Dobson was a kind-hearted man, and a sensible one too. He was thoughtful for a few instants, and then, every feature lighting up with a genuine expression of pleasure, he exclaimed, "I am glad to hear it, Marsh; right glad to hear that you are straight again. Now I'll own the truth. I grumbled at this fine weather, and was so cross yesterday I could have quarrelled with a straw for lying in my way, fancying myself a better judge of what weather was proper for us than He who sent it. And now what is the consequence? That which has only injured me partially, has been of the utmost service to you. Yes, yes, it is wisest and safest too, to let God govern his own world as he sees fit; for come what weather it may, it must needs suit some; and sure enough no one is forgotten or overlooked in the right time, and when his turn comes round."

MAN THE WORK OF AN ALMIGHTY CREATOR.

Can any man, endowed with common sense, imagine that such a body as any of us doth bear about him, so neatly composed, fitted to so many purposes of action, furnished with so many goodly and proper organs; that eye, by which we reach the stars, and in a moment have, as it were, all the world present to us; that ear, by which we so subtlely distinguish the differences of sound, are sensible of so various harmony, have conveyed into our minds the words and thoughts of each other; that tongue, by which we so readily imitate those vast diversities of voice and tone, by which we communicate our minds with such ease and advantage; that hand, by which we perform so many admirable works, and which serves instead of a thousand instruments and weapons unto us; to omit those inward springs of motion, life, sense, imagination, memory, passion, with so stupendous curiosity contrived; can any reasonable man, I say, conceive

that so rare a piece, consisting of such parts, unexpressibly various, unconceivably curious, the want of any of which would discompose or destroy us; subservient to such excellent operations, incomparably surpassing all the works of the most exquisite art that we could ever observe or conceive, be the product of blind chance; arise from the fortuitous jumblings of matter; be effected without exceeding great wisdom, without most deep counsel and design? Might not the most excellent pieces of human artifice, the fairest structures, the finest pictures, the most useful engines, such as we are wont most to admire and praise, much more easily happen to be without any skill or contrivance? If we cannot allow these rude and gross imitations of nature to come of themselves, but will presently, so soon as we see them, acknowledge them the products of art, though we know not the artist, nor did see him work; how much more reasonable is it that we believe the works of nature, so much more fine and accurate, to proceed from the like cause, though invisible to us, and performing its workmanship by a secret hand?—BARROW.

THE USEFUL ARTS AND MANUFACTURES OF GREAT BRITAIN.

HISTORICAL NOTICES OF THE COTTON MANUFACTURE.

WRITERS of antiquity abound in allusions to clothing made of wool and flax; there are, however, but few notices among Greek and Latin writers, and not one among Hebrew writers, referring to cotton. In the old world the growth and manufacture of cotton were confined to those populous regions lying beyond the Indus, which were long unknown to the nations bordering on the Mediterranean; and even in modern times, in the middle ages, continual mention is made of stuffs of woollen, linen, silk, and gold, but cotton remains unnoticed.

Wool was probably one of the first materials used by mankind for cloth. It is mentioned in the Scriptures in connexion with linen, (Deut. xxii. 11; Prov. xxxi. 13); and the manufacture of both these fabrics existed in Greece in the days of Homer.

The arts of spinning and weaving rank next in importance among mankind to agriculture, and must have been invented at a very early period in man's history. They existed in considerable perfection in Egypt, at the time when the Israelites were in bondage in that land. Linen was the national manufacture among the ancient Egyptians. That they were not acquainted with cotton seems evident, from the fact, that among the numerous specimens of mummy-cloth which have been imported into Europe, no cotton has been found; and there are no paintings of the cotton shrub upon the tombs of Thebes, where accurate representations of flax occur in its different states of growth and manufacture. In India, cotton was probably manufactured at as early a period as linen in Egypt, for Herodotus (who wrote 445 B.C.) speaks of the manufacture among the Indians as if it were in a very advanced state. He says:—"They possess a kind of plant, which instead of fruit produces *wool*, of a finer and better quality than that of sheep; of this the Indians make their cloths." Nearchus, the admiral to whom Alexander intrusted the survey of the Indus, (B.C. 327,) states, that "the Indians wore linen garments, the substance whereof they were made growing upon trees; and this is indeed flax, or rather something much whiter and finer than flax. They wear shirts of the same, which reach down to the middle of their legs; and veils, which cover their head and a great part of their shoulders." Strabo also, on the authority of Nearchus, mentions the Indians as being celebrated for flowered cottons or chintzes, and for their various and beautiful dyes. This geographer states, that in his own day (he died A.D. 25) cotton grew,

and cotton cloths were manufactured in Susiana, at the head of the Persian Gulf. Fifty years later Pliny describes the cotton plant and the stuffs made from it. He says, "In Upper Egypt, towards Arabia, there grows a shrub, which some call *gossypium*, and others *xylon*, from which the stuffs are made, which we call *xylina*. It is small, and bears a fruit resembling the filbert, within which is a downy wool, which is spun into thread. There is nothing to be preferred to these stuffs for whiteness or softness: beautiful garments are made from them for the priests of Egypt." The same author, in his description of the island of Tylos, in the Persian Gulf, enumerates, among its remarkable productions, "wool-bearing trees, with leaves exactly like those of the vine, but smaller, bearing a fruit like a gourd, and of the size of a quince, which, bursting when it is ripe, displays a ball of downy wool, from which are made costly garments resembling linen." Arrian, an Egyptian Greek, who lived in the first or second century, notices the exports from India of calicoes, muslins, and other cottons, both plain, and ornamented with flowers, made in the interior provinces; that Masalia, the modern Masulipatam, was then, as it has been ever since, famous for the manufacture of cotton piece-goods; and that the muslins of Bengal were then, as at the present day, superior to all others, and received from the Greeks the name of *Gangitiki*, indicating that they were made on the borders of the Ganges.

Cottons and muslins gradually came into use in Arabia and the neighbouring countries, and the manufacture was diffused by the commercial activity and enterprise of the early followers of Mohammed. The fabrics called *muslins* received their name from *Mosul* in Mesopotamia; as, in the same way, at a later period, *calico* was named after *Calicut*; and the yellowish brown cotton fabrics, called *nankeens*, after the city *Nankin*.

Marco Polo, who visited most of the principal cities of Asia at the latter part of the thirteenth century, notices a manufacture of very fine cotton cloth at Arzingan, in Armenia Major: he states that cotton was abundantly grown and manufactured in Persia and all the provinces bordering the Indus, and that in all parts of India this was the staple manufacture. He also notices, that in the province of Fokien, in China, cottons were woven of coloured threads, which were carried for sale to every part of the province of Mangi; but that silk was the ordinary dress of the people, from the prince to the peasant. The cotton plant first began to be cultivated for common use after the conquest of the empire by the Tartars; a strong resistance was made to its cultivation by the fabricators of wool and silk, but the opposition was soon put down, because, among all the materials of clothing, cotton was found to be best suited to the torrid zone, and the cheapest material of which cloth could be made; therefore, about the year 1368, the cultivation began to prevail throughout the empire. The Chinese cottons, especially the nankeens, have acquired much celebrity. At the present day cotton is not grown in sufficient quantity for the consumption of that empire, so that it is largely imported from India.

Cotton cloth, of African manufacture, was brought to London from Benin, on the coast of Guinea, in 1590. The cotton tree grows plentifully on the borders of the Senegal, the Gambia, and the Niger rivers; at Timbuctoo, Sierra Leone, in the Cape de Verd Islands, on the Coast of Guinea, in Abyssinia, and throughout the interior. The peculiar fitness of the soil and climate of Egypt prompted the present ruler of that country, a few years ago, to introduce the cotton plant, and in two years he exported no less than 5,623 bales to England. As this cotton was raised from the Georgian Sea-Island seeds, it is called *Sea-Island Egyptian cotton*.

The cotton manufacture was found in a very advanced state in America on the discovery of that continent by the Spaniards. Clavigero states, that "of cotton the Mexicans made large webs, and as delicate and fine as those of Holland, which were, with much reason, highly esteemed in Europe. They wove their cloths of different figures and colours, representing different animals and flowers. Of feathers, interwoven with cotton, they made mantles and bed-curtains, carpets,

gowns, and other things, not less soft than beautiful. With cotton also they interwove the finest hair of the belly of rabbits and hares, after having made and spun it into thread; of this they made most beautiful cloths, and in particular winter waistcoats for their lords." Among the presents sent by Cortez to Charles the Fifth, were "cotton mantles, some all white, others mixed with white and black, or red, green, yellow, and blue: waistcoats, handkerchiefs, counterpanes, tapestries, and carpets of cotton." Columbus found the cotton plant growing wild in the West India Islands, and on the continent of South America, where the inhabitants wore cotton dresses, and made their fishing nets of the same material.

To Spain belongs the honour of having introduced the cotton manufacture into Europe. The plant was cultivated and manufactured into clothing in Spain as early as the tenth century, about which time it was probably introduced by the Moors. It flourished on the fertile plains of Valencia, where it still grows wild. During some centuries Barcelona was celebrated for the manufacture of cotton sail-cloth and fustians, the latter being a strong fabric used to line garments, and which derives its name from the Spanish word *fuste*, signifying "substance." The Spanish Arabs made paper from cotton before that most useful article was known in Europe. When the Moors were expelled from Spain, the useful arts disappeared with them, and only by slow and laborious efforts were they introduced into other parts of Europe. The cotton manufacture is said to have been introduced at Venice at the beginning of the fourteenth century. Strong cottons, such as fustians and dimities, were made at Venice and Milan; and it is probable that even those were woven with a linen warp and a cotton weft, as was afterwards the custom in England, from the difficulty at that early period, of making the long, or warp threads, of sufficient strength in cotton to bear stretching in the loom. It is supposed that about this time cotton yarn was imported from Syria and Asia Minor, whence, in later times, the Italians and French obtained that article.

It must not be supposed that the cotton manufacture, as it now exists in England, was borrowed from any other nation. The present manufacture is due entirely to the genius and enterprise of Englishmen; and during little more than half a century it has sprung into existence, and become a sort of centre to the commercial world. At the early period to which our history refers, the only fabric manufactured in this country was a coarse and heavy article, probably half cotton and half linen, of too little importance to attract much notice; but calico, muslin, and the more delicate cotton goods, were never made in Europe, except possibly by the Moors in the south of Spain, until the invention of the spinning machinery in England.

At an early period, the fabrics made at Manchester, and some other towns in Lancashire, were for some reason called *cottons*, though they were actually *woollen* or *linen* goods. It has been suggested, that the word *cottons*, at that day, was only a corruption of *coatings*. The first notice on this subject is by Leland, who visited Lancashire in the reign of Henry the Eighth. He says: "Bolton-upon-Moore market standeth most by *cottons*: divers villages, in the moores, about Bolton, do make *cottons*." This apparent proof of the early existence of the cotton manufacture is, however, disproved by an act of Edward the Sixth (1552), entitled, "For the true making of *woollen* cloth;" in which it is ordered, that all the cottons called Manchester, Lancashire, and Cheshire cottons, shall be of certain specified dimensions and weights, which could by no means apply to cottons, but only to coarse woollens. Camden, speaking of Manchester in 1590, says: "This town excels the towns immediately around it, in handsomeness, populousness, woollen manufactures, market-place, church, and college, but did much more excel them in the last age, as well by the glory of its woollen cloths, which they call Manchester *cottons*, as by the privilege of sanctuary, which the authority of parliament, under Henry the Eighth, transferred to Chester."

It seems impossible to fix the date of the introduction of the cotton

manufacture in England. The earliest actual record on the subject is a work published in the year 1641, called "The Treasure of Traffic," by Lewis Roberts. Speaking of the town of Manchester, he says, "They buy *cotton wool* in London, that comes first from Cyprus and Smyrna, and at home worke the same and perfect it into *fustians, vermillions, dimities*, and other stuffes, and then return it to London, where the same is sold, and not seldom sent into forrain parts, who have means, at far easier termes, to provide themselves of the said first materials."

It appears, therefore, that, in the year 1641, the cotton manufacture had become fairly established in Manchester, from which town not only the home trade, but the distant markets of the Levant, were supplied with several descriptions of cotton goods. The linen manufacture still continued to flourish in Manchester, and indeed linen yarn was used as the warp for fustians, and for most cotton goods in this country, down to the year 1773.

Dr. Fuller, who wrote in 1662, says that the inhabitants of Manchester, "buying the *cotton wool* or *yarne* coming from beyond the sea, make it here into fustians, to the good employment of the poor, and great improvement of the rich therein, serving mean people for their outsides, and their betters for the lining of their garments. Bolton is the staple place for this commodity, being brought thither from all parts of the country. As for Manchester, the *cottons* thereof carry away the credit in our nation, and so they did a hundred and fifty years agoe. For, when learned Leland, on the cost of King Henry the Eighth, with his guide, travailed Lancashire, he called Manchester the fairest and quickest town in this country; and sure I am it hath lost neither spruceness nor spirits since that time. Other commodities made in Manchester are so small in themselves, and various in their kinds, they will fill the shop of a haberdasher of small wares. Being, therefore, too many for me to reckon up or remember, it will be the safest way to wrap them all together in some *Manchester ticken*, and to fasten them with the *pins* (to prevent their falling out and scattering), or tye them with the *tape*; and also, because sure bind, sure find, to bind them about the *points* and *laces* all made in the same place."

Mr. Baines is inclined to think, that the art was brought from Flanders, by the protestant artisans and workmen who fled from Antwerp on the capture and ruin of that great trading city, by the Duke of Parma, in 1585, and also from other cities of the Spanish Netherlands. "Great numbers of these victims of a sanguinary persecution took refuge in England, and some of them settled in Manchester; and there is the stronger reason to suppose that the manufacture of cotton would then be commenced here, as there were restrictions and burdens on foreigners setting up business as masters in England, in the trades then carried on in this country, whilst foreigners commencing a *new* art would be exempt from those restrictions. The warden and fellows of Manchester college had the wisdom to encourage the settlement of the foreign clothiers in that town, by allowing them to cut firing from their extensive woods, as well as to take the timber necessary for the construction of their looms, on paying the small sum of fourpence yearly. At that period of our history, when capital was small, and the movements of trade comparatively sluggish, a new manufacture would be likely to extend itself slowly, and to be long before it attracted the notice of authors. That a manufacture might in those days gradually take root, and acquire strength, without even for half a century being commemorated in any book that should be extant after the lapse of two centuries more, will be easily credited by those who have searched for the records of our modern improvements in the same manufacture. If the greatest mechanical inventions, and the most stupendous commercial phenomena, have passed almost unnoticed in a day when authors were so numerous, the mere infancy of the cotton manufacture may well have been without record in an age when the press was far less active."

EARLY METHODS OF SPINNING.

THE DISTAFF AND SPINDLE.—THE SPINNING-WHEEL.

Among the ancient Egyptians, who were so celebrated for their fine linen, spinning was a domestic occupation common to all ranks of society; and, in our own country, up to a very recent period, the spinning-wheel was an ordinary piece of domestic furniture. The term "spinster," applied to unmarried females, shows how universal was the employment of preparing thread or yarn for the

MODERN EGYPTIAN SPINNING.

weaver. Before the invention of the spinning-wheel, the distaff and rock, or spindle, were the simple instruments employed by the spinster. The distaff was a stick or reed, about a yard in length, with a fork or expansion near the top, round which the cotton was wound, being previously prepared by carding or combing. The distaff was usually held under the left arm, and the fibres were drawn out from the projecting ball, being at the same time spirally twisted by the forefinger and thumb of the right hand. The thread so produced was spun by the turning round of the spindle, and was then wound upon it until the quantity was as great as it

SPINNING WITH DISTAFF AND SPINDLE.

would carry. A fresh spindle was then mounted, and those already loaded with thread were stored in a basket until a sufficient quantity were collected for the weaver.

The spindle was made of a reed, or of some light wood, and was generally from eight to twelve inches in length. At the top was a slit or clasp, for attaching the thread, so that the weight of the spindle might keep it stretched. The lower end was inserted in a whorl or wheel, made of some heavy material, which served to keep it steady, and to promote its rotation. The spinner every now and then gave the spindle a fresh turn, so as to increase the twist of the thread. When the spindle touched the ground, "a length" was said to be spun, and the thread was taken out of the slit, and wound upon the spindle: the upper part was then inserted in the slit, and a new length commenced. The Roman poet Catullus briefly mentions these particulars:—

> "The loaded distaff, in the left hand placed,
> With spongy coils of snow-white wool was graced;
> From these the right hand lengthening fibres drew,
> Which into thread 'neath nimble fingers grew.
> At intervals a gentle touch was given,
> By which the twirling whorl was onward driven.
> Then, when the sinking spindle reach'd the ground,
> The recent thread around its spire was wound,
> Until the clasp within its nipping cleft
> Held fast the newly-finish'd length of weft."

In ancient times the spindle and distaff were frequently made of some precious material, beautifully ornamented. Thus Homer has mentioned the present of a golden distaff being made to Helen; and Theocritus has celebrated the distaff in his twenty-eighth Idyll, on the occasion of a visit to a friend to whose wife he presented an ivory distaff. The poem begins thus:—

> "O distaff, friend to warp and woof,
> Minerva's gift in man's behoof,
> Whom careful housewives still retain
> And gather to their household's gain,
> With me repair," &c.

The Hindoos form their distaff of the leading shoot of some young tree, carefully peeled; and for the spindle they select the beautiful shrub *Euonymus*, which has hence obtained the popular name of "the spindle-tree." With these simple implements, and by means of the exquisite touch which the Hindoos possess, are spun those delicate cotton threads from which the celebrated Indian muslins are made.

The use of the spindle and distaff was superseded in England by the spinning-wheel, in or soon after the reign of Henry the Eighth. It was probably introduced from Hindustan, where it had been in use for ages; but domestic legends say, that it was invented by the fairies, or some supernatural power; and, no doubt, at the time of its introduction, it was regarded as a great discovery in which all classes of society were interested. Two kinds of household wheels have been described as long in use among spinsters; the first is commonly called, in this country, "the big wheel," from the size of its rim, or "the wool wheel," from its being employed in the spinning of sheep's wool. The Saxony, or Leipsic wheel, so called from its German origin, was used for spinning flax, and was an improvement on the old Jersey wheel, as it enabled the spinner to mount two spindles on the same wheel, so as to form a thread with each hand. The worsted wheel was also employed to spin cotton, for which it was equally well adapted; and this it did by two distinct processes. The cotton having been picked and cleaned, was *carded* or brushed with coarse wire brushes, called *hand cards:* the cotton being spread upon one of these, was combed with the other until the fibres were all disposed in one direction: it was then taken off in soft fleecy rolls, called *cardings*, each about twelve inches long, and three-quarters of an inch thick. These *cardings* were next formed into a coarse thread or *roving*; for which purpose one end of the carding was twisted round the spindle, and the spinster with the right hand turned

HINDOO SPINNING WHEEL.

the wheel which, by means of a band or cord, gave motion to the spindle; at the same time she drew out the carding to a certain length with the left hand. The motion thus given to the carding twisted it spirally, and extended it in length. It was then wound upon the spindle, another carding was attached to it, drawn out and twisted as before, and thus was formed a continuous coarse thread or roving. By a second and similar operation the roving was stretched and twisted into a fine strong thread, fit to be used as weft. This double process was necessary, because the cardings could not be at once drawn into a level and even thread fine enough for the loom. The preparation of the rovings was called *coarse spinning*, and that of the thread *fine spinning*. The roving, which was about the thickness of a quill, being fastened to the spindle, was held firmly between the left fore-finger and thumb, at the distance of about six inches from the spindle; the wheel was then turned with the right hand, and at the same time the left hand was drawn away about half a yard, by which means the roving was drawn out into weft; the necessary twist was then given by a few turns of the wheel; and, lastly, the thread was wound upon the spindle into a conical shape, called *a pirn* or *cop*.

It has been already mentioned, that the more firm and even thread of flax was used for the warp. This was largely exported from Ireland, Scotland, and Germany. Cotton yarns were mostly spun in the cottages of the peasantry, and gave abundant occupation to the female members of every poor family. The old dame, or the mother, at her spinning-wheel, forms a domestic picture which cannot be remembered without a feeling of regret that it has passed away for ever. It was then the custom for travelling chapmen, with their pack-horses, to go from door to door to purchase the cotton yarn which had been prepared; but these sources of supply gradually became insufficient to meet the demands of the weaver, who frequently had "to walk three or four miles in a morning, and call on five or six spinners, before he could collect weft to serve him for the remainder of the day; and when he wished to weave a piece in a shorter time than usual, a new ribbon, or a gown was necessary to quicken the

exertions of the spinners."* The prices paid to the spinner were often so high as to take away all or most of the profits of weaving. According to Dr. Taylor,† this was the commencement of the system of infant labour; for spinning being found so profitable, every child in the cottage was forced to help in the process When the father was a weaver and the mother a spinner, the tasks imposed on the children were often cruelly severe. Indeed, with the one-thread wheel, it was scarcely possible for one person, with the greatest industry, to produce a pound of thread in a day. The goods thus manufactured were strong and coarse compared with those now produced. The thread was very unequal, its evenness depending greatly on the delicacy of touch of the spinster, and it varied with every little difference in the drawing out of the thread, and the turns of the spindle in portions of the same length.

* Guest, "History of the Cotton Manufacture."
† "Hand-Book of Cotton, &c. Manufactures."

(*To be continued.*)

THE RESURRECTION OF THE BODY.

THERE are three bodily inhabitants of heaven, Enoch, Elijah, our Saviour Christ: the first before the law; the second under the law; the third under the Gospel: all three in a several form of translation. Our Blessed Saviour raised Himself to and above the heavens by his own immediate power: He ascended as the Son, they as servants; He as God, they as creatures. Elijah ascended by the visible ministry of angels; Enoch insensibly. Wherefore, O God, hast Thou done this, but to give us a taste of what we shall be; to let us see that heaven was never shut to the faithful; to give us an assurance of the future glorification of this mortal and corruptible part? Even thus, O Saviour, when Thou shalt descend from heaven with a shout, with the voice of the archangel, and with the trump of God, we that are alive and remain shall be caught up, together with the raised bodies of thy saints, into the clouds, to meet Thee in the air, to dwell with Thee in glory.—BISHOP HALL.

ON THE TOMBS IN WESTMINSTER ABBEY.

MORTALITY, behold and fear,
What a charge of flesh is here!
Think how many royal bones
Sleep within this heap of stones:
Here they lie, had realms and lands
Who now want strength to stir their hands;
Where from their pulpits seal'd with dust,
They preach—'in greatness is no trust.'
Here's an acre sown indeed
With the richest, royal'st seed,
That the earth did e'er suck in,
Since the first man died for sin:
Here the bones of birth have cried
Though gods they were, as men they died:
Here are wands, ignoble things,
Dropt from the ruin'd sides of kings.
Here's a world of pomp and state,
Buried in dust, once dead by fate.

F. BEAUMONT.